

SEQUENCE LISTING

<110> Shyjan, Andrew W.

<120> COMPOSITIONS AND METHODS FOR THE DIAGNOSIS, PREVENTION
AND TREATMENT OF TUMOR PROGRESSION

<130> 07334/004005

<140> US 09/181,030

<141> 1998-10-27

<150> US 08/862,442

<151> 1997-05-23

<150> US 08/623,679

<151> 1996-03-29

<160> 10

<170> FastSEQ for Windows Version 3.0

<210> 1

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<212> DNA

<213> Mus musculus

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<222> (321)...(1946)

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ctaacagatg	ttgctgtggt	cagctcacta	accagcacat	ccccctttg	ccgagtgggg	180
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tcagcaaaca	caccagagc	tacccaacag	actcctatgg	gattcttgaa	ttccaggggtg	300
ggggttactc	caataaagcc	atg tac atc	cga gtc tcc	tac gac acc	aag cca	353
		Met Tyr Ile Arg	Val Ser Tyr Asp	Thr Lys Pro		
		1	5	10		

gat tcc ctg	ctc cac ctg	atg gtg	aag gac	tgg cag	ctg gag	ctc ccg	401
Asp Ser Leu	Leu His Leu	Met Val	Lys Asp	Trp Gln	Leu Glu	Leu Pro	
	15		20		25		

aag Lys	ctc Leu	ttg Leu 30	ata Ile	tct Ser	gtg Val	cac His	gga Gly 35	ggc Gly	ctc Leu	caa Gln	agc Ser	ttc Phe 40	gag Glu	atg Met	cag Gln	449
tcc Ser	aaa Lys 45	ctg Leu	aag Lys	cag Gln	gtg Val	ttt Phe 50	ggg Gly	aaa Lys	ggg Gly	ctg Leu	atc Ile 55	aag Lys	gct Ala	gcc Ala	atg Met	497
acc Thr 60	acg Thr	ggg Gly	gcg Ala	tgg Trp	atc Ile 65	ttc Phe	acc Thr	ggg Gly	ggg Gly	gtg Val 70	agc Ser	act Thr	ggg Gly	gtc Val	gtc Val 75	545
agc Ser	cat His	gtg Val	ggg Gly	gat Asp 80	gcc Ala	ttg Leu	aaa Lys	gac Asp	cac His 85	tcc Ser	tcc Ser	aag Lys	tcc Ser	aga Arg 90	ggc Gly	593
cgg Arg	ctc Leu	tgt Cys	gct Ala 95	ata Ile	gga Gly	att Ile	gct Ala	ccc Pro 100	tgg Trp	ggc Gly	atg Met	gtg Val 105	gag Glu	aac Asn	aag Lys	641
gaa Glu	gac Asp	ctg Leu 110	att Ile	gga Gly	aaa Lys	gat Asp	gta Val 115	aca Thr	aga Arg	gtc Val	tat Tyr	cag Gln 120	acc Thr	atg Met	tcc Ser	689
aac Asn	cct Pro 125	ctg Leu	agc Ser	aag Lys	ctc Leu	tct Ser 130	gtg Val	ctc Leu	aac Asn	aat Asn	tcc Ser 135	cac His	act Thr	cac His	ttc Phe	737
atc Ile 140	ttg Leu	gct Ala	gac Asp	aac Asn	ggc Gly 145	acc Thr	ctg Leu	ggc Gly	aag Lys	tat Tyr 150	ggg Gly	gct Ala	gag Glu	gtg Val	aag Lys 155	785
ctt Leu	cga Arg	aga Arg	cag Gln	ctg Leu 160	gaa Glu	aaa Lys	cac His	atc Ile	tcc Ser 165	ctg Leu	cag Gln	aag Lys	atc Ile	aac Asn 170	aca Thr	833
agg Arg	ctg Leu	ggc Gly	cag Gln 175	ggg Gly	gta Val	cct Pro	gtc Val	gtg Val 180	ggc Gly	cta Leu	gtg Val	gta Val 185	gaa Glu	ggg Gly	ggg Gly	881
cct Pro	aac Asn 190	gtg Val	gtt Val	tct Ser	atc Ile	gtc Val	ctg Leu 195	gag Glu	tat Tyr	ctc Leu	aaa Lys	gaa Glu 200	gac Asp	cct Pro	cct Pro	929
gtc Val	cct Pro 205	gtg Val	gtg Val	gtt Val	tgc Cys	gat Asp 210	ggc Gly	agt Ser	gga Gly	cgt Arg	gcc Ala 215	tct Ser	gac Asp	att Ile	ttg Leu	977
tcc Ser 220	ttc Phe	gca Ala	cac His	aaa Lys	tac Tyr 225	tgc Cys	gac Asp	gaa Glu	gga Gly	gga Gly 230	gtc Val	ata Ile	aac Asn	gag Glu	tcc Ser 235	1025
ctg Leu	cgg Arg	gac Asp	cag Gln	ctt Leu 240	cta Leu	gtt Val	acc Thr	att Ile	cag Gln	aaa Lys 245	aca Thr	ttt Phe	aat Asn	tac Tyr 250	agc Ser	1073
aag Lys	tcc Ser	cag Gln	tcg Ser 255	tat Tyr	cag Gln	ctg Leu	ttt Phe 260	gca Ala	att Ile	atc Ile	atg Met	gag Glu	tgc Cys 265	atg Met	aag Lys	1121

cag agt aac atg tgg ttc ctt gat gtg ctt ccc caa aag ccc acc tgt 1889
Gln Ser Asn Met Trp Phe Leu Asp Val Leu Pro Gln Lys Pro Thr Cys
510 515 520

gca gaa tgc aac tct tca cct cac ctg tcc caa act gac atc acc cca 1937
Ala Glu Cys Asn Ser Ser Pro His Leu Ser Gln Thr Asp Ile Thr Pro
525 530 535

cct ctg ccc tgacacccag tgcagggcct cctagctttc acatgcagcc 1986
Pro Leu Pro
540

attcacatcg cctctcaaga ctgggccagg cagtgcacc tgtcaagcat gtctgtcctc 2046
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tgtctgtcct tcccaactga cttctgttga cagaagcagt ttccacatga aagcgttgac 2526
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Val His Gly Gly Leu Gln Ser Phe Glu Met Gln Ser Lys Leu Lys Gln
35 40 45
Val Phe Gly Lys Gly Leu Ile Lys Ala Ala Met Thr Thr Gly Ala Trp
50 55 60
Ile Phe Thr Gly Gly Val Ser Thr Gly Val Val Ser His Val Gly Asp
65 70 75 80
Ala Leu Lys Asp His Ser Ser Lys Ser Arg Gly Arg Leu Cys Ala Ile
85 90 95
Gly Ile Ala Pro Trp Gly Met Val Glu Asn Lys Glu Asp Leu Ile Gly
100 105 110
Lys Asp Val Thr Arg Val Tyr Gln Thr Met Ser Asn Pro Leu Ser Lys
115 120 125
Leu Ser Val Leu Asn Asn Ser His Thr His Phe Ile Leu Ala Asp Asn
130 135 140
Gly Thr Leu Gly Lys Tyr Gly Ala Glu Val Lys Leu Arg Arg Gln Leu
145 150 155 160
Glu Lys His Ile Ser Leu Gln Lys Ile Asn Thr Arg Leu Gly Gln Gly
165 170 175
Val Pro Val Val Gly Leu Val Val Glu Gly Gly Pro Asn Val Val Ser
180 185 190
Ile Val Leu Glu Tyr Leu Lys Glu Asp Pro Pro Val Pro Val Val Val
195 200 205
Cys Asp Gly Ser Gly Arg Ala Ser Asp Ile Leu Ser Phe Ala His Lys
210 215 220
Tyr Cys Asp Glu Gly Gly Val Ile Asn Glu Ser Leu Arg Asp Gln Leu
225 230 235 240

Leu Val Thr Ile Gln Lys Thr Phe Asn Tyr Ser Lys Ser Gln Ser Tyr
 245 250 255
 Gln Leu Phe Ala Ile Ile Met Glu Cys Met Lys Lys Lys Glu Leu Val
 260 265 270
 Thr Val Phe Arg Met Gly Ser Glu Gly Gln Gln Asp Val Glu Met Ala
 275 280 285
 Ile Leu Thr Ala Leu Leu Lys Gly Thr Asn Ala Ser Ala Pro Asp Gln
 290 295 300
 Leu Ser Leu Ala Leu Ala Trp Asn Arg Val Asp Ile Ala Arg Ser Gln
 305 310 315 320
 Ile Phe Val Phe Gly Pro His Trp Pro Pro Leu Gly Ser Leu Ala Pro
 325 330 335
 Pro Val Asp Thr Lys Ala Ala Glu Lys Glu Lys Lys Pro Pro Thr Ala
 340 345 350
 Thr Thr Lys Gly Arg Gly Lys Gly Lys Gly Lys Lys Lys Gly Lys Val
 355 360 365
 Lys Glu Glu Val Glu Glu Glu Thr Asp Pro Arg Lys Leu Glu Leu Leu
 370 375 380
 Asn Trp Val Asn Ala Leu Glu Gln Ala Met Leu Asp Ala Leu Val Leu
 385 390 395 400
 Asp Arg Val Asp Phe Val Lys Leu Leu Ile Glu Asn Gly Val Asn Met
 405 410 415
 Gln His Phe Leu Thr Ile Pro Arg Leu Glu Glu Leu Tyr Asn Thr Arg
 420 425 430
 Leu Gly Pro Pro Asn Thr Leu His Leu Leu Val Arg Asp Val Lys Lys
 435 440 445
 Ser Asn Leu Pro Pro Asp Tyr His Ile Ser Leu Ile Asp Ile Gly Leu
 450 455 460
 Val Leu Glu Tyr Leu Met Gly Gly Ala Tyr Arg Cys Asn Tyr Thr Arg
 465 470 475 480
 Lys Ser Phe Arg Thr Leu Tyr Asn Asn Leu Phe Gly Pro Lys Arg Val
 485 490 495
 Glu Leu Ser Arg His Thr Val Ser Cys Ala Ser Gln Ser Asn Met Trp
 500 505 510
 Phe Leu Asp Val Leu Pro Gln Lys Pro Thr Cys Ala Glu Cys Asn Ser
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<400> 5
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23

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tttgtaattc	ctagcacgaa	agactctaac	aggtgttgct	gtggccagtt	caccaaccag	180
catatcccc	ctctgccaa	tgcaacaccc	agcaaaaatg	aagaggaaag	caaacagggtg	240
gagactcagc	ctgagaaatg	gtctgttgcc	aagcacaccc	agagctaccc	aacagattcc	300
tatggagttc	ttgaattcca	gggtggcgga	tattccaata	aagcc atg	tat atc cgt	357

Met Tyr Ile Arg
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gta tcc tat gac acc aag cca gac tca ctg ctc cat ctc atg gtg aaa	405
Val Ser Tyr Asp Thr Lys Pro Asp Ser Leu Leu His Leu Met Val Lys	
5 10 15 20	

gat tgg cag ctg gaa ctc ccc aag ctc tta ata tct gtg cat gga ggc	453
Asp Trp Gln Leu Glu Leu Pro Lys Leu Leu Ile Ser Val His Gly Gly	
25 30 35	

ctc cag aac ttt gag atg cag ccc aag ctg aaa caa gtc ttt ggg aaa	501
Leu Gln Asn Phe Glu Met Gln Pro Lys Leu Lys Gln Val Phe Gly Lys	
40 45 50	

ggc ctg atc aag gct gct atg acc acc ggg gcc tgg atc ttc acc ggg	549
Gly Leu Ile Lys Ala Ala Met Thr Thr Gly Ala Trp Ile Phe Thr Gly	
55 60 65	

ggt gtc agc aca ggt gtt atc agc cac gta ggg gat gcc ttg aaa gac	597
Gly Val Ser Thr Gly Val Ile Ser His Val Gly Asp Ala Leu Lys Asp	
70 75 80	

cac tcc tcc aag tcc aga ggc cgg gtt tgt gct ata gga att gct eca	645
His Ser Ser Lys Ser Arg Gly Arg Val Cys Ala Ile Gly Ile Ala Pro	
85 90 95 100	

tgg ggc atc gtg gag aat aag gaa gac ctg gtt gga aag gat gta aca	693
Trp Gly Ile Val Glu Asn Lys Glu Asp Leu Val Gly Lys Asp Val Thr	
105 110 115	

aga gtg tac cag acc atg tcc aac cct cta agt aag ctc tct gtg ctc	741
Arg Val Tyr Gln Thr Met Ser Asn Pro Leu Ser Lys Leu Ser Val Leu	
120 125 130	

aac aac tcc cac acc cac ttc atc ctg gct gac aat ggc acc ctg ggc	789
Asn Asn Ser His Thr His Phe Ile Leu Ala Asp Asn Gly Thr Leu Gly	
135 140 145	

aag tat ggc gcc gag gtg aag ctg cga agg ctg ctg gaa aag cac atc	837
Lys Tyr Gly Ala Glu Val Lys Leu Arg Arg Leu Leu Glu Lys His Ile	
150 155 160	

tcc ctc cag aag atc aac aca aga ctg ggg cag ggc gtg ccc ctc gtg	885
Ser Leu Gln Lys Ile Asn Thr Arg Leu Gly Gln Gly Val Pro Leu Val	
165 170 175 180	

ggt ctc gtg gtg gag ggg ggc cct aac gtg gtg tcc atc gtc ttg gaa	933
Gly Leu Val Val Glu Gly Gly Pro Asn Val Val Ser Ile Val Leu Glu	
185 190 195	
tac ctg caa gaa gag cct ccc atc cct gtg gtg att tgt gat ggc agc	981
Tyr Leu Gln Glu Glu Pro Pro Ile Pro Val Val Ile Cys Asp Gly Ser	
200 205 210	
gga cgt gcc tcg gac atc ctg tcc ttt gcg cac aag tac tgt gaa gaa	1029
Gly Arg Ala Ser Asp Ile Leu Ser Phe Ala His Lys Tyr Cys Glu Glu	
215 220 225	
ggc gga ata ata aat gag tcc ctc agg gag cag ctt cta gtt acc att	1077
Gly Gly Ile Ile Asn Glu Ser Leu Arg Glu Gln Leu Leu Val Thr Ile	
230 235 240	
cag aaa aca ttt aat tat aat aag gca caa tca cat cag ctg ttt gca	1125
Gln Lys Thr Phe Asn Tyr Asn Lys Ala Gln Ser His Gln Leu Phe Ala	
245 250 255 260	
att ata atg gag tgc atg aag aag aaa gaa ctc gtc act gtg ttc aga	1173
Ile Ile Met Glu Cys Met Lys Lys Lys Glu Leu Val Thr Val Phe Arg	
265 270 275	
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Met Gly Ser Glu Gly Gln Gln Asp Ile Glu Met Ala Ile Leu Thr Ala	
280 285 290	
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Leu Leu Lys Gly Thr Asn Val Ser Ala Pro Asp Gln Leu Ser Leu Ala	
295 300 305	
ctg gct tgg aac cgc gtg gac ata gca cga agc cag atc ttt gtc ttt	1317
Leu Ala Trp Asn Arg Val Asp Ile Ala Arg Ser Gln Ile Phe Val Phe	
310 315 320	
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Gly Pro His Trp Thr Pro Leu Gly Ser Leu Ala Pro Pro Thr Asp Ser	
325 330 335 340	
aaa gcc acg gag aag gag aag aag cca ccc atg gcc acc acc aag gga	1413
Lys Ala Thr Glu Lys Glu Lys Lys Pro Pro Met Ala Thr Thr Lys Gly	
345 350 355	
gga aga gga aaa ggg aaa ggc aag aag aaa ggg aaa gtg aaa gag gaa	1461
Gly Arg Gly Lys Gly Lys Gly Lys Lys Lys Gly Lys Val Lys Glu Glu	
360 365 370	
gtg gag gaa gaa act gac ccc cgg aag ata gag ctg ctg aac tgg gtg	1509
Val Glu Glu Glu Thr Asp Pro Arg Lys Ile Glu Leu Leu Asn Trp Val	
375 380 385	
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Asn Ala Leu Glu Gln Ala Met Leu Asp Ala Leu Val Leu Asp Arg Val	
390 395 400	
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Asp Phe Val Lys Leu Leu Ile Glu Asn Gly Val Asn Met Gln His Phe	
405 410 415 420	

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Met Leu Leu Thr Asp Met Trp Met Gly Arg Leu Arg Met Arg Lys Asn	
665 670 675	
ccc ggc ctg aag gtt atc atg ggg att ctt cta ccc ccc acc atc ttg	2421
Pro Gly Leu Lys Val Ile Met Gly Ile Leu Leu Pro Pro Thr Ile Leu	
680 685 690	
ttt ttg gaa ttt cgc aca tat gat gat ttc tcg tat caa aca tcc aag	2469
Phe Leu Glu Phe Arg Thr Tyr Asp Asp Phe Ser Tyr Gln Thr Ser Lys	
695 700 705	
gaa aac gag gat ggc aaa gaa aaa gaa gag gaa aat acg gat gca aat	2517
Glu Asn Glu Asp Gly Lys Glu Lys Glu Glu Glu Asn Thr Asp Ala Asn	
710 715 720	
gca gat gct ggc tca aga aag ggg gat gag gag aac gag cat aaa aaa	2565
Ala Asp Ala Gly Ser Arg Lys Gly Asp Glu Glu Asn Glu His Lys Lys	
725 730 735 740	
cag aga att atc ccc atc gga aca aaa atc tgt aaa ttc tat aac gcg	2613
Gln Arg Ile Ile Pro Ile Gly Thr Lys Ile Cys Lys Phe Tyr Asn Ala	
745 750 755	
ccc att gtc aag ttc tgg ttt tac aca ata tca tac ttg ggc tac ctg	2661
Pro Ile Val Lys Phe Trp Phe Tyr Thr Ile Ser Tyr Leu Gly Tyr Leu	
760 765 770	
ctg ctg ttt aac tac gtc atc ctg gtg cgg atg gat ggc tgg ccg tcc	2709
Leu Leu Phe Asn Tyr Val Ile Leu Val Arg Met Asp Gly Trp Pro Ser	
775 780 785	
ctc cag gag tgg atc gtc atc tcc tac atc gtg agc ctg gcg tta gag	2757
Leu Gln Glu Trp Ile Val Ile Ser Tyr Ile Val Ser Leu Ala Leu Glu	
790 795 800	
aag ata cga gag atc ctc atg tca gaa cca ggc aaa ctc agc cag aaa	2805
Lys Ile Arg Glu Ile Leu Met Ser Glu Pro Gly Lys Leu Ser Gln Lys	
805 810 815 820	
atc aaa gtt tgg ctt cag gag tac tgg aac atc aca gat ctc gtg gcc	2853
Ile Lys Val Trp Leu Gln Glu Tyr Trp Asn Ile Thr Asp Leu Val Ala	
825 830 835	
att tcc aca ttc atg att gga gca atg gcc acg aga tct gtg atg atg	2901
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840 845 850	
att gga aag atg atg atc gac atg ctg tac ttt gtg gtc atc atg ctg	2949
Ile Gly Lys Met Met Ile Asp Met Leu Tyr Phe Val Val Ile Met Leu	
855 860 865	
gtc gtg ctc atg agt ttc gga gta gcc cgt caa gcc att ctg cat cca	2997
Val Val Leu Met Ser Phe Gly Val Ala Arg Gln Ala Ile Leu His Pro	
870 875 880	
gag gag aag ccc tct tgg aaa ctg gcc cga aac atc ttc tac atg ccc	3045
Glu Glu Lys Pro Ser Trp Lys Leu Ala Arg Asn Ile Phe Tyr Met Pro	
885 890 895 900	

tac tgg atg atc tat gga gag gtg ttt gca gac cag ata gac ctc tac	3093
Tyr Trp Met Ile Tyr Gly Glu Val Phe Ala Asp Gln Ile Asp Leu Tyr	
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gcc atg gaa att aat cct cct tgt ggt gag aac cta tat gat gag gag	3141
Ala Met Glu Ile Asn Pro Pro Cys Gly Glu Asn Leu Tyr Asp Glu Glu	
920 925 930	
ggc aag cgg ctt cct ccc tgt atc ccc ggc gcc tgg ctc act cca gca	3189
Gly Lys Arg Leu Pro Pro Cys Ile Pro Gly Ala Trp Leu Thr Pro Ala	
935 940 945	
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Leu Met Ala Cys Tyr Leu Leu Val Ala Asn Ile Leu Leu Val Asn Leu	
950 955 960	
ctg att gct gtg ttc aac aat acc ttc ttt gaa gta aaa tca ata tcc	3285
Leu Ile Ala Val Phe Asn Asn Thr Phe Phe Glu Val Lys Ser Ile Ser	
965 970 975 980	
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Asn Gln Val Trp Lys Phe Gln Arg Tyr Gln Leu Ile Met Thr Phe His	
985 990 995	
gac agg cca gtc ctg ccc cca ccg atg atc att tta agc cac atc tac	3381
Asp Arg Pro Val Leu Pro Pro Pro Met Ile Ile Leu Ser His Ile Tyr	
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atc atc att atg cgt ctc agc ggc cgc tgc agg aaa aag aga gaa ggg	3429
Ile Ile Ile Met Arg Leu Ser Gly Arg Cys Arg Lys Lys Arg Glu Gly	
1015 1020 1025	
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1045 1050 1055 1060	
ttc cgg gag aag gag gat gag cag cag tgc tcc agc gac gag cgc atc	3573
Phe Arg Glu Lys Glu Asp Glu Gln Gln Ser Ser Ser Asp Glu Arg Ile	
1065 1070 1075	
cgg gtc act tct gaa aga gtt gaa aat atg tca atg agg ttg gaa gaa	3621
Arg Val Thr Ser Glu Arg Val Glu Asn Met Ser Met Arg Leu Glu Glu	
1080 1085 1090	
atc aat gaa aga gaa act ttt atg aaa act tcc ctg cag act gtt gac	3669
Ile Asn Glu Arg Glu Thr Phe Met Lys Thr Ser Leu Gln Thr Val Asp	
1095 1100 1105	
ctt cga ctt gct cag cta gaa gaa tta tct aac aga atg gtg aat gct	3717
Leu Arg Leu Ala Gln Leu Glu Glu Leu Ser Asn Arg Met Val Asn Ala	
1110 1115 1120	
ctt gaa aat ctt gcg gga atc gac agg tct gac ctg atc cag gca cgg	3765
Leu Glu Asn Leu Ala Gly Ile Asp Arg Ser Asp Leu Ile Gln Ala Arg	
1125 1130 1135 1140	

tcc cgg gct tct tct gaa tgt gag gca acg tat ctt ctc cgg caa agc Ser Arg Ala Ser Ser Glu Cys Glu Ala Thr Tyr Leu Leu Arg Gln Ser 1145 1150 1155	3813
agc atc aat agc gct gat ggc tac agc ttg tat cga tat cat ttt aac Ser Ile Asn Ser Ala Asp Gly Tyr Ser Leu Tyr Arg Tyr His Phe Asn 1160 1165 1170	3861
gga gaa gag tta tta ttt gag gat aca tct ctc tcc acg tca cca ggg Gly Glu Glu Leu Leu Phe Glu Asp Thr Ser Leu Ser Thr Ser Pro Gly 1175 1180 1185	3909
aca gga gtc agg aaa aaa acc tgt tcc ttc cgt ata aag gaa gag aag Thr Gly Val Arg Lys Lys Thr Cys Ser Phe Arg Ile Lys Glu Glu Lys 1190 1195 1200	3957
gac gtg aaa acg cac cta gtc cca gaa tgt cag aac agt ctt cac ctt Asp Val Lys Thr His Leu Val Pro Glu Cys Gln Asn Ser Leu His Leu 1205 1210 1215 1220	4005
tca ctg ggc aca agc aca tca gca acc cca gat ggc agt cac ctt gca Ser Leu Gly Thr Ser Thr Ser Ala Thr Pro Asp Gly Ser His Leu Ala 1225 1230 1235	4053
gta gat gac tta aag aac gct gaa gag tca aaa tta ggt cca gat att Val Asp Asp Leu Lys Asn Ala Glu Glu Ser Lys Leu Gly Pro Asp Ile 1240 1245 1250	4101
ggg att tca aag gaa gat gat gaa aga cag aca gac tct aaa aaa gaa Gly Ile Ser Lys Glu Asp Asp Glu Arg Gln Thr Asp Ser Lys Lys Glu 1255 1260 1265	4149
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gac aaa tca gat gtt caa aac act cag cta aca gtg gaa acg aca aat Asp Lys Ser Asp Val Gln Asn Thr Gln Leu Thr Val Glu Thr Thr Asn 1285 1290 1295 1300	4245
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gat gta gag tac agt tca atc acg gac cag caa ttg acg acg gaa tgg Asp Val Glu Tyr Ser Ser Ile Thr Asp Gln Gln Leu Thr Thr Glu Trp 1350 1355 1360	4437
caa tgc caa gtt caa aag atc acg cgc tct cat agc aca gat att cct Gln Cys Gln Val Gln Lys Ile Thr Arg Ser His Ser Thr Asp Ile Pro 1365 1370 1375 1380	4485

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Tyr Ile Val Ser Glu Ala Ala Val Gln Ala Glu Gln Lys Glu Gln Phe	
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Ala Asp Met Gln Asp Glu His His Val Ala Glu Ala Ile Pro Arg Ile	
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Pro Arg Leu Ser Leu Thr Ile Thr Asp Arg Asn Gly Met Glu Asn Leu	
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Leu Ser Val Lys Pro Asp Gln Thr Leu Gly Phe Pro Ser Leu Arg Ser	
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Lys Ser Leu His Gly His Pro Arg Asn Val Lys Ser Ile Gln Gly Lys	
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Leu Asp Arg Ser Gly His Ala Ser Ser Val Ser Ser Leu Val Ile Val	
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Ser Gly Met Thr Ala Glu Glu Lys Lys Val Lys Lys Glu Lys Ala Ser	
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Ile Phe Thr Gly Gly Val Ser Thr Gly Val Ile Ser His Val Gly Asp	
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Ala Leu Lys Asp His Ser Ser Lys Ser Arg Gly Arg Val Cys Ala Ile	
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Gly Ile Ala Pro Trp Gly Ile Val Glu Asn Lys Glu Asp Leu Val Gly	
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Ile	Val	Leu	Glu	Tyr	Leu	Gln	Glu	Glu	Pro	Pro	Ile	Pro	Val	Val	Ile
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Cys	Asp	Gly	Ser	Gly	Arg	Ala	Ser	Asp	Ile	Leu	Ser	Phe	Ala	His	Lys
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Tyr	Cys	Glu	Glu	Gly	Gly	Ile	Ile	Asn	Glu	Ser	Leu	Arg	Glu	Gln	Leu
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Leu	Val	Thr	Ile	Gln	Lys	Thr	Phe	Asn	Tyr	Asn	Lys	Ala	Gln	Ser	His
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Arg	Lys	Asn	Phe	Arg	Thr	Leu	Tyr	Asn	Asn	Leu	Phe	Gly	Pro	Lys	Arg
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Pro	Lys	Ala	Leu	Lys	Leu	Leu	Gly	Met	Glu	Asp	Asp	Glu	Pro	Pro	Ala
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Cys	Leu	Lys	Leu	Ala	Val	Ala	Ala	Lys	His	Arg	Asp	Phe	Ile	Ala	His
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Met	Val	Asn	Ala	Leu	Glu	Asn	Leu	Ala	Gly	Ile	Asp	Arg	Ser	Asp	Leu
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 Lys Glu Glu Lys Asp Val Lys Thr His Leu Val Pro Glu Cys Gln Asn
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 Ile His Gly Gln Asp Lys Ser Asp Val Gln Asn Thr Gln Leu Thr Val
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Trp Gly Ile Val Glu Asn Lys Glu Asp Leu Val Gly Lys Asp Val Thr	
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Arg Val Tyr Gln Thr Met Ser Asn Pro Leu Ser Lys Leu Ser Val Leu	
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Asn Asn Ser His Thr His Phe Ile Leu Ala Asp Asn Gly Thr Leu Gly	
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Lys Tyr Gly Ala Glu Val Lys Leu Arg Arg Leu Leu Glu Lys His Ile	
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Ser Leu Gln Lys Ile Asn Thr Arg Leu Gly Gln Gly Val Pro Leu Val	
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ctg Leu	ctg Leu	ttt Phe	aac Asn	tac Tyr	gtc Val	atc Ile	ctg Leu	gtg Val	cgg Arg	atg Met	gat Asp	ggc Gly	tgg Trp	ccg Pro	tcc Ser	2709		
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ctc Leu	cag Gln	gag Glu	tgg Trp	atc Ile	gtc Val	atc Ile	tcc Ser	tac Tyr	atc Ile	gtg Val	agc Ser	ctg Leu	gcg Ala	tta Leu	gag Glu	2757		
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aag Lys	ata Ile	cga Arg	gag Glu	atc Ile	ctc Leu	atg Met	tca Ser	gaa Glu	cca Pro	ggc Gly	aaa Lys	ctc Leu	agc Ser	cag Gln	aaa Lys	2805		
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920																925	930	
ttc Phe	tac Tyr	atg Met	ccc Pro	tac Tyr	tgg Trp	atg Met	atc Ile	tat Tyr	gga Gly	gag Glu	gtg Val	ttt Phe	gca Ala	gac Asp	cag Gln	3189		
935																940	945	

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tat cat ttt aac gga gaa gag tta tta ttt gag gat aca tct ctc tcc Tyr His Phe Asn Gly Glu Glu Leu Leu Phe Glu Asp Thr Ser Leu Ser 1205 1210 1215 1220	4005
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agt cac ctt gca gta gat gac tta aag aac gct gaa gag tca aaa tta Ser His Leu Ala Val Asp Asp Leu Lys Asn Ala Glu Glu Ser Lys Leu 1270 1275 1280	4197
ggg cca gat att ggg att tca aag gaa gat gat gaa aga cag aca gac Gly Pro Asp Ile Gly Ile Ser Lys Glu Asp Asp Glu Arg Gln Thr Asp 1285 1290 1295 1300	4245
tct aaa aaa gaa gaa act att tcc cca agt tta aat aaa aca gat gtg Ser Lys Lys Glu Glu Thr Ile Ser Pro Ser Leu Asn Lys Thr Asp Val 1305 1310 1315	4293
ata cat gga cag gac aaa tca gat gtt caa aac act cag cta aca gtg Ile His Gly Gln Asp Lys Ser Asp Val Gln Asn Thr Gln Leu Thr Val 1320 1325 1330	4341
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acg acg gaa tgg caa tgc caa gtt caa aag atc acg cgc tct cat agc Thr Thr Glu Trp Gln Cys Gln Val Gln Lys Ile Thr Arg Ser His Ser 1400 1405 1410	4581
aca gat att cct tac att gtg tgg gaa gct gca gtg caa gct gag caa Thr Asp Ile Pro Tyr Ile Val Ser Glu Ala Ala Val Gln Ala Glu Gln 1415 1420 1425	4629

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Ala Leu Lys Asp His Ser Ser Lys Ser Arg Gly Arg Val Cys Ala Ile	
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Glu Lys His Ile Ser Leu Gln Lys Ile Asn Thr Arg Leu Gly Gln Gly	
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Val Pro Leu Val Gly Leu Val Val Glu Gly Gly Pro Asn Val Val Ser	
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Cys	Asp	Gly	Ser	Gly	Arg	Ala	Ser	Asp	Ile	Leu	Ser	Phe	Ala	His	Lys
Tyr	Cys	Glu	Glu	Gly	Gly	Ile	Ile	Asn	Glu	Ser	Leu	Arg	Glu	Gln	Leu
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Gln	Leu	Phe	Ala	Ile	Ile	Met	Glu	Cys	Met	Lys	Lys	Lys	Glu	Leu	Val
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Thr	Val	Phe	Arg	Met	Gly	Ser	Glu	Gly	Gln	Gln	Asp	Ile	Glu	Met	Ala
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Ile	Phe	Val	Phe	Gly	Pro	His	Trp	Thr	Pro	Leu	Gly	Ser	Leu	Ala	Pro
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Pro	Thr	Asp	Ser	Lys	Ala	Thr	Glu	Lys	Glu	Lys	Lys	Pro	Pro	Met	Ala
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Arg	Lys	Asn	Phe	Arg	Thr	Leu	Tyr	Asn	Asn	Leu	Phe	Gly	Pro	Lys	Arg
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545					550					555					560
Leu	Trp	Gln	Arg	Gly	Glu	Glu	Ser	Met	Ala	Lys	Ala	Leu			

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Lys Thr Asp Val Ile His Gly Gln Asp Lys Ser Asp Val Gln Asn Thr
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Gln Leu Thr Val Glu Thr Thr Asn Ile Glu Gly Thr Ile Ser Tyr Pro
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Val Ala Glu Ala Ile Pro Arg Ile Pro Arg Leu Ser Leu Thr Ile Thr
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